

WHAT IS CLAIMED IS:

1. A gas generator comprising:
a pressure vessel containing a gas under a first predetermined pressure;
an initiator housing secured to and closing one end of said pressure vessel, said initiator housing having an opening at the inner end thereof closed by an initiator rupture disk constructed to rupture at a second predetermined pressure in said initiator housing greater than said first predetermined pressure;
a micro gas generator or initiator disposed within said initiator housing;
a manifold secured to and closing the other end of said pressure vessel, said manifold having an opening at the inner end thereof closed by a manifold rupture disk constructed to rupture at a third predetermined pressure greater than said first predetermined pressure;
whereby upon the firing of said micro gas generator or initiator, the gas pressure in said initiator housing increases to or exceeds said second predetermined pressure to rupture said initiator rupture disk and create a pressure wave that travels through said pressure vessel to create a localized pressure at said manifold rupture disk that equals or exceeds said third predetermined pressure to rupture said manifold rupture disk and allow flow of gas through said manifold before the gas in said pressure vessel is significantly heated and pressurized by the gas flow from said initiator housing.
2. The gas generator of claim 1 wherein said first predetermined pressure is approximately 4,000-8,000 psi, and said second predetermined pressure is approximately two times higher than said first predetermined pressure.
3. The gas generator of claim 2 wherein said third predetermined pressure is approximately 1.8 times higher than said first predetermined pressure.
4. The gas generator of claim 1 wherein said gas under a first predetermined pressure is a gas mixture of argon and helium.
5. The gas generator of claim 1 wherein said gas under a first predetermined pressure is a gas mixture of nitrogen and helium.

6. The gas generator of claim 1 wherein said pressure vessel is formed of a lightweight high strength material.

7. The pressure vessel of claim 6 wherein said material is low carbon steel or aluminum.

8. The pressure vessel of claim 1 wherein said initiator housing is welded to said pressure vessel.

9. The gas generator of claim 8 wherein said manifold is welded to said pressure vessel.

10. The gas generator of claim 1 wherein said manifold is constructed to provide for radial flow therefrom.

11. The gas generator of claim 1 wherein said manifold is constructed to provide for axial flow therefrom.

12. The gas generator of claim 1 wherein a micro-gas generator is disposed within said initiator and is constructed to generate sufficient heat to prevent liquification of the gas in said pressure vessel upon rupture of said initiator rupture disk and said manifold rupture disk.

13. A method of generating gas for a device to be inflated or pressurized, comprising:

providing a pressure vessel containing a gas under a first predetermined pressure;

providing an initiator housing closing one end of said pressure vessel and having an opening at the inner end thereof closed by an initiator rupture disk constructed to rupture at a second predetermined pressure in said initiator housing greater than said first predetermined pressure;

providing a micro-gas generator or initiator within said initiator housing;

providing a manifold closing the other end of said pressure vessel, said manifold having an opening at the inner end thereof closed by a manifold rupture disk constructed to rupture at a third predetermined pressure greater than said first predetermined pressure; and.

firing said micro-gas generator or initiator to increase the gas pressure in said initiator housing to a value equal to or exceeding said second predetermined pressure to rupture said initiator rupture disk and create a pressure wave that travels through said pressure vessel to create a localized pressure at said manifold rupture disk that equals or exceeds said third predetermined pressure to rupture said manifold disk and allow flow of gas through said manifold before the gas in said pressure vessel is significantly heated and pressurized by the gas flow from said initiator housing.

14. The method of claim 13 wherein said first predetermined pressure is approximately 4,000-8,000 psi, and said second predetermined pressure is approximately two times higher than said first predetermined pressure.

15. The method of claim 14 wherein said third predetermined pressure is approximately 1.8 times higher than said first predetermined pressure.

16. The method of claim 13 wherein said gas under said first predetermined pressure is a gas mixture of argon and helium.

17. The method of claim 13 wherein said gas under said first predetermined pressure is a gas mixture of nitrogen and helium.

18. The method of claim 13 wherein the flow of gas through said manifold upon rupture of said manifold rupture disk is at a temperature of less than approximately 21°C.